
An Evaluation of a Remote, Rural Clinic Manned by a Physician's Assistant

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THE CONCEPT OF REMOTE CLINICS manned by new health practitioners has recently held great promise in the United States. Educators, clinicians, planners, and researchers have been intrigued with the idea that a remote, or satellite, physician's assistant (PA) or nurse practitioner by consulting regularly with a nearby physician could provide all of the primary care needed by residents of rural physicianless communities—becoming a kind of “barefoot doctor,” American style (1–7).

Such clinics have been seen as one solution to the maldistribution of physicians. Other proposed solutions are training more and more physicians, thus changing the supply to demand ratio and forcing physicians out of the overserved cities; selecting from small rural towns more medical students, who presumably would be willing to return to these towns after training (8); obligating physicians to work in underserved areas on the selective service model, or to repay aid for medical education (9); and creating better linkages in the health delivery system and providing access to care for everyone through transport-focused or regionalized outreach programs (10).

We offer evidence, based on 2 years of evaluative research, that remote clinics operated by new health practitioners may not solve the problem. In fact, these clinics may be overly dependent on public subsidy for economic survival, a development which is detrimental to a satisfying professional relationship between the new health practitioner and the employing physician, and they may prove over time to be a frustrating

endeavor for the new health practitioners. In short, these clinics may be a medical anachronism, counterproductive to recent advances in the delivery of medical and health care services.

Background

The first year of our evaluation focused on a single PA-manned remote clinic in the town of Yale (population 1,239) in north central Oklahoma (11). The Yale Clinic was opened by a pediatrician in his 40s who had an established practice in the larger university town of Stillwater (population 31,126), 20 miles away. Expressing the values of academic medicine, (“We don't just automatically give people a shot every time they want one.”), as well as humanistic, pragmatic, and entrepreneurial concerns, he envisioned the remote clinic as an exciting and innovative enterprise. His recently employed physician's assistant (from the Oklahoma University PA Program) shared these values and relished the idea of testing newly acquired skills in a physicianless town where he would be the primary source of medical care. Fearing a transcendence of the boundaries of PA practice, which by law requires supervision by a physician, the Oklahoma State Board of Medical Examiners granted temporary approval of the remote clinic and, to ensure supervision, stipulated that the assistant reside in Stillwater. A Stillwater internist was recruited to provide the supervision for problems of adult patients.

A full-time receptionist-bookkeeper from Stillwater was hired, and the Yale Clinic began regular operation in December 1973. It was located in a renovated storefront facility with one examining room and a small laboratory. The pediatrician-employer visited the clinic for several hours weekly to examine business records. After 2 months, clinic hours were reduced to morning hours only. The reasons stated by the employing physician were (a) a low patient volume in Yale and (b) a demand for PA services at the base practice in Still-

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This study was supported by DHEW contract No. 296-74-0001, Bureau of Health Manpower, Public Health Service.

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water. A local receptionist was hired to replace the Stillwater receptionist in keeping with the shortened workday.

From our first year's evaluation we concluded that a PA-manned remote clinic was for that short term medically feasible. Patients reported a high level of satisfaction; the PA diagnosed and treated a full complement of primary care problems; and the indicators of patient satisfaction, physician supervision, case history review, and consultation rate suggested a reasonable level of quality care. The clinic was economically unfeasible, however, despite an average unit cost per encounter of about \$10—considered low by contemporary primary care standards (12). Three interrelated factors appeared to be responsible: (a) underutilization of the PA's clinical services, (b) absence of third-party reimbursement under Federal and State Medicare-Medicaid policies, and (c) an erratic and often reduced rate application of the employing physician's fixed-fee schedule. Since a household survey of 102 respondents at the end of the first year's operation indicated a substantially lower rate of utilization by those eligible for services covered by a third-party payer, we concluded that the reimbursement factor was likely paramount.

During our second year of evaluation, we sought to probe more deeply into the same parameters of feasibility studied earlier—utilization, acceptance, quality of care, and economics—but through a controlled comparison of the Yale Clinic with three other private rural Oklahoma clinics where PAs performed primary care services and where the physician was not remote. All 3 control clinics were located in towns having 3,500–15,000 total populations; 75–99 percent of the residents were white, 18–26 percent were over age 62, and 28–39 percent had annual household incomes of less than \$5,000, according to the 1970 census.

The characteristics of the residents of Yale, where the remote clinic was located, fell within the upper and lower limits of these demographic parameters.

Methods

The comparative evaluation of the Yale Clinic with the three control clinics relied primarily on computer analysis of patient encounter forms filled out by all primary care providers at each clinic. Approximately 1,000 encounters were randomly sampled at each site over a 5-month period to obtain data for the following variables: (a) problem type by body system—head, ear, eye, nose, and throat (HEENT); neurological, neck, back, respiratory, cardiovascular, gastrointestinal, genitourinary extremities, integument, and general; (b) problem class, acute or chronic; (c) sequence of practitioners seeing the patient during the same visit;

(d) fee assessed for the visit; and (e) mode of payment—Medicare, Medicaid, private insurance, or self-pay. Computer analysis of these data included both frequencies and cross tabulations (for example, sequence of practitioners by fee assessed, payment mode by fee assessed, and so forth).

Data from all patient encounters at the Yale Clinic during the second year were analyzed by computer. The frequencies obtained in this analysis were directly comparable to those obtained in the first year's evaluation and permitted the assessment of trends with regard to (a) utilization by month, (b) kinds of problems seen, (c) actions taken by the PA in treatment, (d) fee assessment by month, and (e) clinic costs by month.

The economic data (fee assessment and third-party reimbursement) taken from the patient encounter forms collected at all four clinics during the 5-month comparative period and data from the satellite clinic's business records were used in computer simulation to determine the relative impacts of fee amounts and third-party reimbursement on the viability of the satellite clinic.

A chart audit using two tracer problems (urinary tract infection and otitis media) was performed to gain some insight into the quality of care rendered by the PA in the Yale clinic in providing primary care services in a satellite setting. A total of 21 charts listing urinary tract infection and 34 charts listing otitis media as new were reviewed for the following information: history of illness, including symptoms, duration, previous episodes, and drug reactions; physical examination findings; laboratory tests and diagnosis; and management plan.

During the comparative evaluation and concurrent with the collection of patient encounter forms at the control clinics, patient encounters with the PAs were observed on a random daily basis. These observations were supplemented by focused interviews with the PAs and other clinic staff, including the employing physician.

Results

Despite its longer time of operation, an initial return to full-time operation, and efforts to bring third-party eligibles into the practice through a \$6 Federal subsidy for all patient encounters, use of the PA-manned remote clinic actually declined slightly during the second year (table 1). (The Federal subsidy was in the form of reimbursement for time spent filling out an encounter form, which was used not only as the patient record but also for meeting research data needs.) As in the first year, the PA averaged about two patients per hour and continued to see patients with a wide range of ambulatory problems (table 2); however, by compari-

son with PAs and MDs at the three control clinics, the remote PA was more likely to see more general and perhaps less challenging problems (table 3). Table 4 shows that while the remote PA was underutilized, the PAs in the control clinics carried a patient load comparable to physicians in their respective practices; in control clinic 1, a majority of the load.

With regard to quality of care, a much emphasized issue that is seldom defined clearly and precisely, we found that the remote PA's actions changed somewhat in several areas from the first to the second year. Prescribing oral medication, advising and counseling patients, and performing urinalyses increased, but medical procedures, followup clinic appointments, referrals, cultures, and other laboratory procedures declined (table 5). An audit of all the remote clinic's records for new cases of otitis media and urinary tract infection, believed to be important quality of care tracers (13), showed a low frequency of documentation of quality criteria—especially in the "history and physical examination" area (table 6).

Data on consultation rates gathered from the encounter forms and from field observations of PA-managed patient encounters at the control clinics suggest that a dimension of PA-MD joint practice is not present in a remote practice. PAs in the control clinics handled about 98 percent of all primary care problems alone, without formal over-the-shoulder supervision (correlating well with the practice of the remote PA), but observational data revealed a significant level of informal consultation: 22 percent in one control clinic, 25 percent in another, and 27 percent in the last. Most of these informal consultations were initiated by PAs. Some examples follow.

In control clinic 1, the PA saw a young mother with

her 3-month old baby for a routine well-baby check. The mother complained that she still had vaginal bleeding. After examining the baby, the PA left the examining room to consult with his employing physician who was in the office shared by the two practitioners. The physician suggested that the PA order an injection of Depoprevara for the mother and advise her that if the bleeding continued, dilatation and curettage may be necessary. The PA then gave the order for the injection to the nurse and returned to the examining room and explained to the patient that if the medication was not effective, she would have to be treated surgically.

In control clinic 2, after initially seeing a male patient and ordering an X-ray of his back, the PA approached a clinic physician in the corridor. The PA described the patient's current complaint of lower back pain and reviewed the history of the patient's sustaining back strain while loading heavy cement blocks onto a truck. The PA asked the physician to look at the X-ray, which the PA thought showed nothing remarkable. Both

Table 2. Percentages of patient encounters at Yale Clinic, by frequency of problems, December 1973–November 1975

Problem	First year (N = 2,415)	Second year (N = 2,333)
Upper respiratory infection ...	18.7	15.9
Checkup	11.9	16.4
Bronchopneumonia	8.1	3.1
Otitis media	6.4	6.7
Gastrointestinal, excluding gastroenteritis	6.0	3.8
Rashes, excluding allergies ..	5.7	3.9
Trauma	5.5	5.4
Hypertension	5.1	6.5
Musculoskeletal, excluding trauma	4.5	4.2
Genitourinary	2.9	4.7
Major heart disease	2.7	1.2
Nervousness	2.6	1.5
Complicated medical	2.2	2.4
Obesity	2.2	2.6
Pus collections	2.1	1.7
Allergic rashes	1.6	5.8
Asthma	1.6	0.8
Peripheral vascular	1.4	0.8
Diabetes	1.2	0.8
Neurological disorders	1.1	0.3
Psychological problem	1.0	1.5
Gynecologic infection	1.0	2.3
Menstrual problem	0.8	0.4
Gastroenteritis	0.7	1.8
Thyroid disorder	0.6	0.9
Cancer of any kind	0.5	0.8
Warts	0.5	0.4
Second-degree burn	0.5	0.5
Impotence	0.1	0.0
Hemorrhoids	0.0	0.2

Table 1. Patient encounters at the Yale Clinic, December 1973–November 1975

Month	First year	Second year
December	170	290
January	232	271
February	308	148
March	224	140
April	210	87
May	162	157
June	179	150
July	178	176
August	173	381
September	179	188
October	288	176
November	112	169
Total	2,415	2,333

practitioners looked at the X-ray together, and the physician affirmed that there was no obvious injury. The PA suggested prescribing an anti-inflammatory medication and a pain reliever. The physician concurred and suggested that the PA also review back exercises with the patient. The PA then returned to the examining room to advise the patient.

In control clinic 3, the PA saw a woman who had been hospitalized for high blood pressure and tachycardia and who was currently being maintained on Inderol. The patient complained of feeling weak and drowsy. The PA explained that the Inderol might be the cause of her weakness and drowsiness and that he would like to lower the dosage. He then advised her that he would check with the physician in the clinic who had prescribed the medication. The consultation took place in the physician's office while the patient waited. Returning, the PA informed the patient that the physician had agreed to adjust the Inderol dosage and explained the adjustment.

Other informal consultations were after the fact, occurring in conversations about patients whom the PA had seen. The PA gave the physician an update of the patients' status. In summary, consultations were initiated by the PAs to gain the physician's suggestions for managing an ongoing problem or to gain insight into a patient's history and motivations. Admittedly, such consultations are more for the benefit of the PA's general knowledge than for benefit in patient outcome and thus are only indirectly related to quality of care.

We conclude that patient acceptance was unsatisfactory because of the remote clinic's lack of growth in patient volume during its second year of operation. Findings from a household survey at the end of the first year were mixed, however: (a) 96 percent of the respondents who had visited the clinic reported satis-

faction with the services received, and nearly a third of this group identified the PA as their "family doctor," (b) 58.7 percent of the respondents suggested that people in town might not use the clinic because of an ongoing relationship with a physician in a nearby town, and (c) 62.7 percent cited convenience, rather than professional qualities, as the most important reason for using the remote PA's services. The following incident, recounted by the PA in an interview conducted during the second year, is perhaps representative of what might be called "soft" acceptance:

While performing a routine physical required for

Table 3. Comparison of Yale Clinic with three Oklahoma control clinics, by problem locus, August–December, 1975

Problem locus	Yale Clinic encounters		Control clinic encounters ¹	
	Number	Percent	Number	Percent
General	368	34.0	586	18.6
Head, ear, eye, nose, and throat	219	20.2	381	12.0
Neurological	28	2.6	67	2.1
Neck	1	0.1	32	1.0
Back	20	1.8	47	1.5
Respiratory	51	4.7	252	8.0
Cardiovascular	79	7.3	400	12.8
Gastro-intestinal	46	4.2	203	6.4
Genitourinary	81	7.5	469	14.9
Extremities	60	5.5	437	13.8
Integument	130	12.0	280	8.9
Total	1,083	100.0	3,154	100.0

¹ No significant difference found between primary care problems seen by control clinic physicians and those seen by control clinic PAs.

Table 4. Comparison of Yale Clinic with three control clinics, by patient encounter loads of practitioners, August–December 1975

Practitioner	Yale Clinic		Clinic 1		Clinic 2		Clinic 3	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Physician's assistant	1,083	100.0	795	75.0	295	25.7	336	35.5
Physician A . . . . .	.....	.....	253	23.9	244	21.3	212	22.4
Physician B . . . . .	.....	.....	¹ 8	0.8	229	19.9	341	36.0
Physician C . . . . .	.....	.....	¹ 4	0.4	114	9.9	² 52	5.5
Physician D . . . . .	.....	.....	.....	.....	266	23.2	² 5	0.5
Total ³	1,083	100.0	1,060	100.0	1,148	100.0	946	100.0

¹ Specialists who sometimes saw patients with primary care problems in the service of physician A.

² Retired physician C who covered for physician B while the latter was on vacation; physician D was new to the practice.

³ Yale Clinic encounters are total encounters for the period indicated. Control clinic encounters represent volume-regulated sampling, by week, during the same period.

participation in sports, the PA discovered a pathological condition in the patient's ears. He telephoned the boy's mother to advise her of his findings and to suggest a plan of treatment. He was told not to institute treatment because an appointment had been made for the following day with a physician in a nearby community.

In this instance, the PA was accepted as a physical examiner, but not as the provider of treatment for a specific, but minor, pathological disorder when a physician was available nearby.

Operational costs for the remote clinic in Yale exceeded revenues by about \$7,000 during the first year. The deficit increased during the second year, and table 7 shows why. It is clear that the remote PA was undercharging for services. The employing physician's fixed-fee schedule set a range of \$12-\$20 for an initial office visit and \$5-\$8 for a followup, in contrast to an average fee of about \$5 at the remote clinic. (The average fee at the three control clinics was almost \$15.) Nor was third-party reimbursement a significant factor in this

Table 5. Yale Clinic encounters, by action frequency,¹ December 1973–November 1975

Action	First year		Second year	
	Number	Percent	Number	Percent
Oral medication	932	38.6	1,115	47.8
Medical procedure (including immunization)	893	37.0	234	10.0
Advising-counseling patients	671	27.8	823	35.3
Appointment with clinic ²	560	23.2	326	14.0
Injection	416	17.2	280	12.0
Referral	228	9.4	129	5.5
Culture	227	9.4	124	5.3
Other laboratory procedures	170	7.0	21	0.9
Counseling family . .	145	6.0	178	7.6
Well child examination	51	2.1	56	2.4
Surgical procedure . .	44	1.8	11	0.5
Urinalysis	25	1.0	45	1.9
Upper gastrointestinal series . .	2	0.1	0	0.0
Blood count or sedimentation rate	2	0.1	13	0.6
Prenatal examination or conference	0	0.0	1	0.0
Total	4,281	100.0	3,368	100.0

¹ Based on tabulations from medical records.

² Followup appointments at remote clinic plus referral appointments elsewhere.

Table 6. Quality criteria¹ appearing on Yale Clinic's medical records for otitis media and urinary tract infection

Quality criteria	Percent frequency of performance	
	Otitis media	Urinary tract infection
History:		
1. Symptoms	52.9	47.6
2. Duration	8.8	90.5
3. Previous episodes	18.8	19.0
4. Present medications	16.6	47.6
5. Previous drug reactions	5.9	47.6
Physical examination:		
1. Findings	82.4	33.3
2. Throat	38.2	0.0
Management plan:		
1. Antibiotic type	100.0	23.8
2. Antibiotic dosage	100.0	4.8
3. Duration	100.0	
4. Followup	85.3	
Urinary tract infection		
History:		
1. Fever	47.6	95.2
2. Symptoms	90.5	76.2
3. Duration	19.0	
4. History of urinary tract infection	47.6	
5. Previous drug reactions	47.6	
Physical examination:		
1. Blood pressure	33.3	
2. Temperature	0.0	
3. Abdominal examination	23.8	
4. External genitalia	4.8	
Laboratory and diagnosis:		
1. Complete urinalysis	95.2	
2. Urine culture	76.2	
Management plan:		
1. Antibiotic	100.2	
2. Duration of therapy	95.2	

¹ Established in 1975 but not yet fully tested by the National Board of Medical Examiners, Advisory Committee for the PA Validation Study.

Table 7. Patient encounters at Yale Clinic, by fees assessed, December 1973–November 1975

Fees assessed	First year		Second year	
	Number	Percent	Number	Percent
\$0	435	18.0	647	27.7
\$ 1–\$ 2	28	1.2	93	4.0
\$ 3–\$ 4	313	12.9	102	4.4
\$ 5–\$ 6	756	31.3	777	33.3
\$ 7–\$ 8	474	19.6	531	22.8
\$ 9–\$10	166	6.9	42	1.8
\$11–\$12	132	5.5	65	2.8
\$13–\$14	36	1.5	30	1.2
\$15 or more	75	3.1	46	2.0

differential, as evidenced by a statistical cross-tabulation of total fee by source of payment. A computer simulation of various utilization conditions, fee differentials, and patient load revealed that a reversal of policy governing third-party reimbursement for the services of new health practitioners would have reduced the Yale Clinic's losses during the second year from about \$1,000 to \$500 per month. The maintenance of a fee schedule comparable to that of the control clinics, on the other hand, would have provided a small monthly profit—with no increase in patient load.

Discussion and Conclusions

Seen in a comparative perspective, the new rural clinic manned by a physician's assistant does not seem to be as satisfactory a solution as perceived earlier (11). Our evaluation revealed that the remote PA was consistently underutilized, did little medical-record documentation, and did not maintain an economically viable fee schedule.

Although data from other remote clinics are not yet extensive, the Yale Clinic's situation is not anomalous. Reid and co-workers (4), for example, reported that a full-time clinic operated by a family nurse practitioner in rural New Mexico averaged 1 hour and 20 minutes per patient visit. Still more convincing is the finding of Riess and Lawrence, who studied eight remote practices in operation for at least 1 year in the rural northwestern States, that the patient volume was “. . . so low that underutilization of the N.H.P. [new health practitioner] would appear to be prevalent” (14).

Despite considerable survey-based evidence of favorable acceptance of the remote new health practitioner (2,5,11), we suggest that the ultimate test of acceptance lies in utilization—by whom, how often, and for what? Moreover, acceptance of the remote new health practitioner must be compared to his or her acceptance in a clinic where the physician is not remote. It may follow that since neither distance nor cost are the primary determinants of choice in care seeking among rural Americans (15), most consumers would more readily accept the new health practitioner directly associated with a physician.

The medical record audit, the encounter statistics, and the in-depth interviews suggest that the remote PA in the Yale Clinic during the second year of practice was in the process of disengagement from his patients, their records, and their problems. Although a recent study found no positive association between quality criteria appearing on medical records (of urinary tract infections) and the outcome of care (16) and other investigations suggest that in primary care the outcomes of new health practitioners are comparable to those of the MD (17,18), it appears that the solo nurse

practitioner or PA, while capable of competent functioning, perhaps loses an important dimension of the role socialized for during training: an interactive dependence upon the employing physician that contributes to job satisfaction and facilitates quality of care. From a sociological perspective, the rate of consultations observed in the control clinics in this study is related not only to the legalities governing the PA-MD relationship, but to the dynamics of a dyadic relationship wherein continual reification of the other's presence and interest is essential to maintain that relationship. To strengthen this assertion, not only were the control PAs observed consulting informally with the physicians, but the physicians also consulted informally with the PAs, though less frequently. Being able to consult directly with a respected colleague about an interesting or perplexing case must be of considerable value for any practitioner.

In the only comparable published research on the economics of remote clinics operated by new health practitioners, Riess and Lawrence note the relationship between low fees and clinic deficits. Of the eight northwest clinics studied, only two, those without subsidy, recorded a small profit. In five of the subsidized practices, deficits increased as the subsidy increased—paralleling the process observed in the Yale Clinic (7). It seems possible that subsidy of remote clinics, however well-meaning, may be self-defeating and negate the likelihood of a cost-effective operation. Correspondingly, a deficit operation may dampen the enthusiasm of the new health practitioner and lessen his or her opportunities for salary increases.

Because remote practices staffed by new health practitioners have been hailed as an innovative solution to physician maldistribution, the practitioner who selects such practice may initially acquire considerable social honor, in both the local and professional communities. Newspaper and television coverage is almost a given. If, however, the clinic is chronically underused, does not attain expected self-sufficiency, or does not become the primary care source for most of the target population, such social honor may quickly fade and the prestige of the practitioner's role diminish. Apparently even the “barefoot doctor” in China has become, over time, dissatisfied and disillusioned because of blocked mobility aspirations (19).

Because of the problems detailed in this study, and despite the reported impressive performances of primary care new health practitioners working closely with physicians (20–24), we believe that the weight of evidence may now have shifted away from favoring remote clinics manned by new health practitioners. We are convinced that further studies in this area will require a longitudinal approach if they are to be of value.

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SYNOPSIS

HILL, ROBERT F. (University of Oklahoma Health Sciences Center), GREENWOOD, JUDITH G., and WERT, FRANK S.: *An evaluation of a remote rural clinic manned by a physician's assistant. Public Health Reports, Vol. 94, January-February 1979, pp. 60-66.*

Among proposed solutions to the problem of physician maldistribution is the operation of remote, rural clinics by new health practitioners. A 2-year study was made of one such clinic in Oklahoma, which was manned only by a physician's assistant with supervision by a physician from another community. The study included a comparison of the physicianless clinic with three control clinics in Oklahoma manned by

PAs and physicians and numerous clinics operated by new health practitioners and physicians in other States. The authors concluded that for the study clinic (a) underutilization was prevalent and acceptance was questionable, based on a low volume of patients, (b) quality care was questionable, based on professional isolation and departure from the role socialized for in training, and (c) economic viability was doubtful, based on low revenue generation and dependence on outside subsidy.

During the 2 years, patient encounters at the study clinic—open only in the mornings—remained steady at approximately 200 per month, as did the PA's treatment of a wide range of primary care problems; however, fee-generated reve-

nue declined from an already deficit position. In a 5-month comparison of the study clinic with the three control clinics, it was found that the control clinic PAs carried patient loads comparable to those of the physicians, patients' problems were more likely to be specific and to generate almost three times more in office visit fees than those of the remote clinic, and the approximately 25 percent rate of informal consultation between the PAs and physicians in the control clinics was seen as consistent with the quality of care and professional satisfaction. A longitudinal perspective on the remote clinic manned by a new health practitioner may show it to be professionally disillusioning and operationally unsatisfactory.